

# Flexible, High Performance Microlens Array Technologies for Integral Field Spectrographs, Phase I

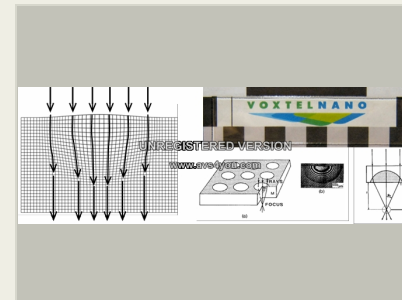
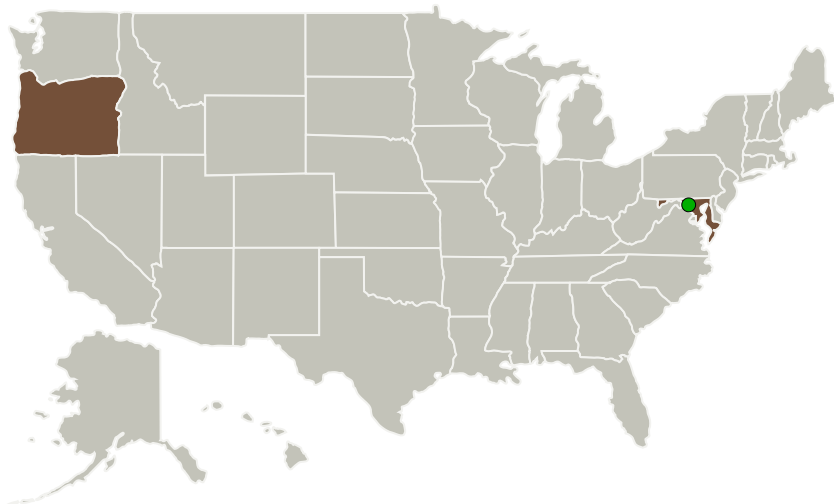
Completed Technology Project (2013 - 2013)



## Project Introduction

For the purposes of advancing integral field spectrograph (IFS) microlens capabilities, a new class of high-quality optics-grade nanostructured organic-inorganic nanocomposite three-dimensional (3D) gradient index (GRIN) microlens optical materials is proposed. In the Phase I program, solid state freeform (SFF) fabrication of high contrast 3D-gradient-index microlens array elements will be demonstrated using a research grade printer. A design of experiment will be conducted to optimize a series of 3D-GRIN films with axial, radial, and vertical gradient optical index patterns with microlenses of varying diameter, pitch, and focal length, including those symmetric and asymmetric. The films will be thoroughly characterized using optical coherent tomography and spectral interferometric techniques, and their power will be tested using collimated and converging light. A series of planar microlens arrays of varying shape, diameter, density, focal length will then be fabricated, and then planar films with two-surface microlens array, including masking, will be fabricated using the measured process parameters (i.e.  $\Delta n$ ,  $\Delta n/(\Delta x, y, z)$ , dispersion, etc.)

## Primary U.S. Work Locations and Key Partners



Flexible, High Performance  
Microlens Array Technologies for  
Integral Field Spectrographs

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Organizations Performing Work	Role	Type	Location
Voxtel, Inc.	Lead Organization	Industry	Beaverton, Oregon
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

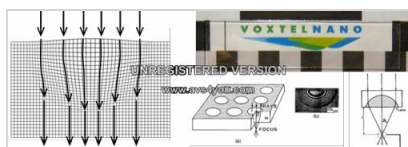
Primary U.S. Work Locations	
Maryland	Oregon

## Project Transitions

**May 2013:** Project Start**November 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140432>)

## Images

**Project Image**

Flexible, High Performance  
Microlens Array Technologies for  
Integral Field Spectrographs  
(<https://techport.nasa.gov/image/128473>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Voxtel, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

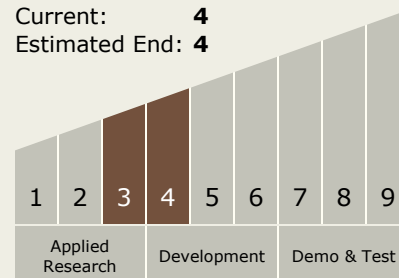
**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Charles Dupuy

## Technology Maturity (TRL)

Start: **3**Current: **4**Estimated End: **4**

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## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.3 Optical Components

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System